

Claims

[c1] What is claimed is:

1.A method for fabricating a through hole comprising:
forming a conductive structure on a substrate, wherein the conductive structure comprises at least a conductive layer and a cap layer positioned on the conductive layer;
forming a patterned first photoresist layer on the substrate and the conductive structure to define at least a pattern of a through hole;
performing a first etching process to remove the cap layer not covered by the first photoresist layer until at least a first portion of the conductive layer is exposed;
removing the first photoresist layer;
forming a dielectric layer and a patterned second photoresist layer on the substrate in sequence, wherein a pattern of the second photoresist layer is the same as a pattern of the first photoresist layer; and
performing a second etching process to remove the dielectric layer not covered by the second photoresist layer until the first portion of the conductive layer is exposed.

[c2] 2.The method of claim 1, wherein the conductive layer is a metal layer, and the cap layer is an anti-reflection

coating (ARC) layer.

- [c3] 3.The method of claim 1, wherein the step of forming the conductive structure on the surface of the substrate comprises:
- forming the conductive layer on the substrate;
 - forming the cap layer on the conductive layer;
 - forming a patterned third photoresist layer on the cap layer to define the conductive structure;
 - performing a third etching process by taking the third photoresist layer as an etching mask to remove the cap layer and the conductive layer not covered by the third photoresist layer; and
 - removing the third photoresist layer.
- [c4] 4.The method of claim 3, wherein the first etching process and the third etching process are performed in the same reaction chamber.
- [c5] 5.The method of claim 3, wherein the first etching process and the third etching process utilize the same etching agent.
- [c6] 6.The method of claim 2, wherein the metal layer comprises an aluminum alloy layer.
- [c7] 7.The method of claim 2, wherein the ARC layer comprises a titanium nitride or/and titanium (TiN/Ti) layer.

- [c8] 8. The method of claim 7, wherein the etching agent of the first etching process is selected from the group consisting of BCl_3/Cl_2 , CCl_4 , and SF_6 .
- [c9] 9. The method of claim 1, wherein the conductive layer comprises a doped polysilicon layer, and the cap layer comprises a silicon nitride layer.
- [c10] 10. The method of claim 1, wherein the dielectric layer comprises an oxide layer.
- [c11] 11. The method of claim 10, wherein an etching agent of the second etching process is selected from the group consisting of CHF_3 , CF_4 , and Ar.